

Contributions from the Department of Biology, University of
Western Australia—No. 8.

**A Description of Two New Terrestrial Isopods from Western
Australia, by Professor Geo. E. Nicholls, D.Sc., F.L.S., and Helena
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(Read July 13, 1926. Published August 10, 1926.)

A few specimens of one of the terrestrial Isopods which form the subject of the present contribution were first taken by one of us (G.E.N.) in January 1924. These were found hiding under moss growing upon the shaded side of a giant Karri. Nearly two years later (Nov. 1925), when a field instruction class was held at Normalup they were obtained in larger numbers. The greater part were taken along the bank of the Frankland River under large logs in the immediate wake of an extensive and still burning bush fire, but they were nowhere really plentiful.

The animal is quite small and its inconspicuous colouring with its habit of curling up into a ball and rolling away when disturbed renders it by no means an easy object to collect. Its generally spinous condition also helps greatly to conceal it among the debris into which it usually falls.

Such a remarkable development of spines, it is worthy of note, appears to be paralleled only in a Natal species, *Akermania spinosa* Collinge, *Diploexochus* (*Cubaris*) *echinatus* Brandt, from Brazil, and *Cubaris longispinis* Richardson, recorded from Panama. Whether this has been independently developed in the four species and should be attributed merely to convergent evolution or whether it is to be considered as indicating community of descent is not easy to decide. The facts of distribution would perhaps favour the latter alternative and in this view, it is a question whether the South American and Australian forms, at least, should not be removed from *Cubaris* and assigned to a distinct genus. The South African species of *Diploexochus* described by Panning (1924), do not show similar development of spines. *Akermania* appears

anteriorly, truncate and re-curved posteriorly and slightly excavate laterally. It bears two spines anteriorly.

The *Uropoda* (Pl. XIX, figs. 10 and 11) are short and small, not extending beyond the telson, and occupying the space between the epimera of the fifth segment and the terminal segment. The peduncles are large, broader than long and roughly pentagonal in shape. The whole surface is covered with overlapping scales which in one region form an oblique ridge, a number of layers in thickness. The exopodite, if present, should be situated on the distal end of this ridge, but is apparently absent or so very greatly reduced as to be unrecognizable. The endopodite does not reach to the end of the terminal segment, is slender and bears apically a long spine and two smaller ones. The whole of its surface is covered with fine setae.

The *walking legs* are all alike, ambulatory, and very feebly developed.

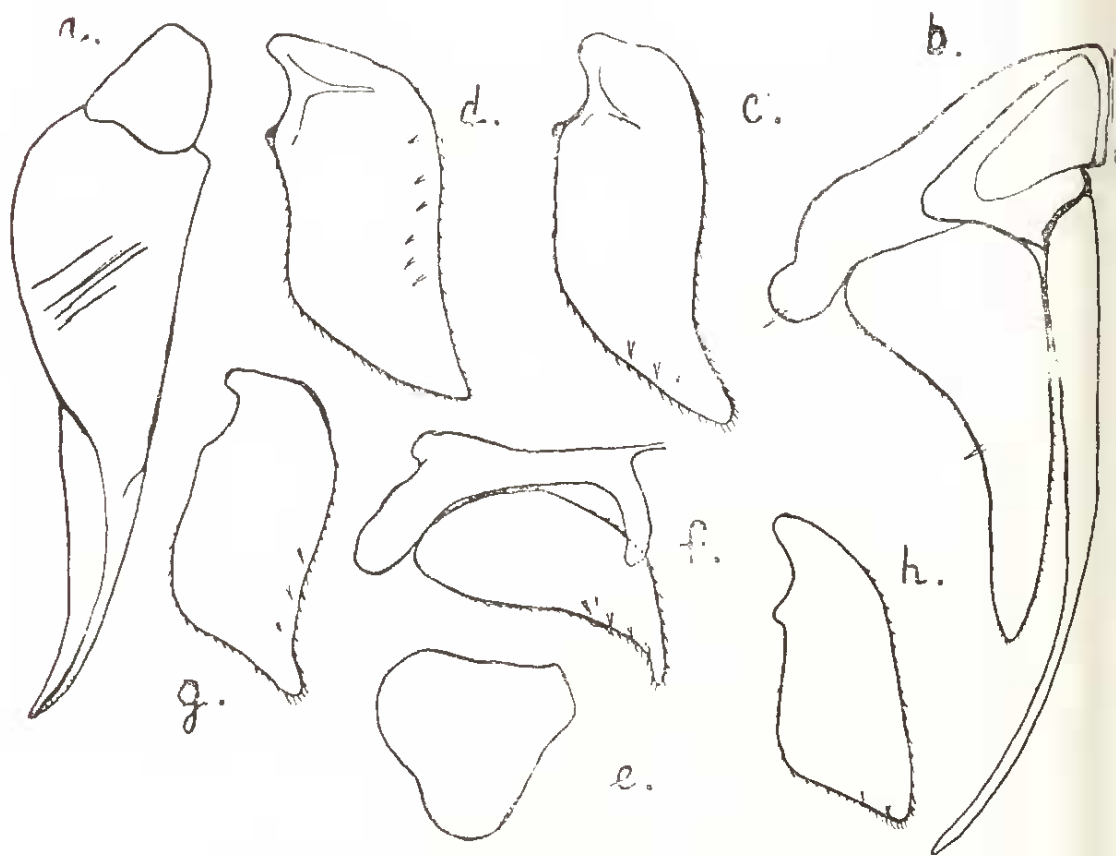


FIG. 1.—*Cubaris wilsmorei*, male: *a*, endopodite of first pleopod; *b*, second pleopod; *c*, exopodite of third pleopod; *d*, exopodite of fourth pleopod; *e*, endopodite of fourth pleopod. Female: *f*, second pleopod; *g*, exopodite of third pleopod; *h*, exopodite of fourth pleopod.

The *pleopods* are arranged in a tile-like manner. Their shape and proportions can be made out most satisfactorily from the figures. In the *male* the exopodites on the first pair (of pleopods) are lacking, those of the second pair (fig. 1b) well formed and reaching practically to the end of the third pair. The third (fig. 1c), fourth (fig. 1d) and fifth pairs also have well developed exopodites, the fifth pair being similar in shape to the fourth, but smaller.

The endopodites of the first pair (fig. 1a) are broad at the base and narrow distally, those of the second (fig. 1b) very long, reaching almost to the end of the fifth pair of pleopods, and tapering to a point. The third, fourth (fig. 1c) and fifth are roughly triangular in shape, and branchial in function.

In the *female* the first pair has the exopodites in the form of very delicate chitinous plates. The second pair (fig. 1f) is well formed, the third (fig. 1g), fourth (fig. 1h) and fifth, the fourth and fifth being similar in shape.

The first and second pairs (fig. 1f) of endopodites are represented by chitinous plates, the third to the fifth normal and similar in shape to those of the male. The margins of the second to the fifth pairs of exopodites in both the male and female are fringed with setae.

No trace of tracheae could be recognised in the exopodites notwithstanding a careful examination.

Colour, in life, creamy white with faint dark markings, some showing a pinkish tint. Little change occurs in preserved specimens.

Length, of the largest specimens obtained, six millimetres.

Habitat, within the bark of living trees, under fallen logs and in decaying stumps near the banks of Frankland River, Nornalup, S.W. Australia.

Remarks.

In its general appearance, with its strongly developed spines and scales and with its freely projecting epimera *C. wilsmorei* presents a marked resemblance to *Akermania spinosa* Collinge. A further resemblance is seen in the condition of the uropods of the two species, which while differing somewhat in shape are at least unlike those structures normally present in *Cubaris*. The terminal abdominal segments of the two, also, do not differ more than might be expected in two different but closely related species.

But by the possession of antennules and in the shape of the cephalon, *C. wilsmorei* is definitely excluded from the genus *Akermania*, the cephalon is, indeed, typically cubarid.

In other respects, however, this species differs from a typical *Cubaris* to much the same extent as does *Akermania*. The feeble development of the walking legs, the form of the terminal abdominal segment and uropods, the folded coxopodites of the mesosomatic segments are all more or less exceptional in this genus.

The great development of spines is, as already pointed out, paralleled only in the S. African and S. American forms. Buddelund's description of one of the latter *Diplocochus* (*Cubaris*) *echinatus* Brandt, is unfortunately not available, but from Miss Richardson's notes (1912, p. 479) it would appear to be remarkably like *C. wilsmorei*.

Cubaris longispinis Richardson, with which it has very evident affinities, has coxopodites upon the first and second mesosomatic segments, differing, however, in form and position. There are, also, minor differences, in the cephalon (which instead of being slightly excavate is raised), in the number and arrangement of the spines, and in the presence of the exopodite upon the uropod. No mention is made by Miss Richardson of scales, it is probable, therefore, that they are absent.

In the apparent absence of an exopodite on the uropods *C. wilsmorei* seems to differ from *C. longispinis*, *D. echinatus* and *A. spinosa*.

Concerning the respiratory organs nothing is stated in either *A. spinosa* or *C. longispinis*. In *C. wilsmorei*, as noted above, a most careful search and the cutting and examination of serial sections failed to reveal any trace of tracheae.

Thus, although in many features this Western Australian form does not conform strictly to the Cubarid type, it seems advisable for the present at least, to refer the species to that genus. It is possibly intermediate in character between the South American form *C. longispinis* and the South African *Akermania spinosa*.

The second of these new species is a member of the family Scyphacidae and of the genus *Actæcia*. It appears to be the first member of this genus to be recorded from Western Australia.

This species was first collected by one of us (G.E.N.) at Cottesloe, July 1924. Further specimens have since been collected at Leighton and Cottesloe, July 1925 and April 1926, but in very small numbers. Their colour and habits, as mentioned below, make them extremely difficult to find and probably account for the smallness of the collection.

It fits very well into Chilton's generic description of *Actæcia* (1901, p. 130), and appears to be intermediate in structure between the two species he has described (1901) *A. euehroa* and *A. ophiensis*.

It is readily distinguished from both these species by the considerable development of the coxopodites on the first three mesosomatic segments, and the form and structure of the pleopods, as well as by differences in the mandibles and maxillipedes.

Actaecia pallida sp. nov. (Plate XX and Text fig. 2.)

The *body* (Pl. XX, fig. 1) is convex, almost exactly twice as long as broad, surface scabrous and covered with short scattered spines most evident upon the appendages and along the lateral margins of the body.

The *cephalon* is rounded with the frontal margin raised slightly, depressed in the middle.

The *eyes* are large, round, with numerous ocelli, and occupy the greater portion of the lateral region of the cephalon.

In the *antennules* (Pl. XX, fig. 3) three joints are distinguishable. The whole appendage tapers gradually to the apex, which bears two or three moderately long spines; laterally a number of shorter spines are present.

The *antennae* (Pl. XX, fig. 2) are extremely spinous. The flagellum is almost as long as the terminal joint and four-jointed, the terminal one being very slender, more than twice as long as broad, and bearing apically a number of setae.

The *upper lip* has the usual structure.

The *left mandible* (Pl. XX, fig. 14) has the outer cutting edge composed of three strong chitinous teeth, the inner of four. At the base of the inner row is the ciliated lappet which is extremely setose. Below this three penicilla are present (1 + 2) and a very long bushy seta.

The *right mandible* (Pl. XX, fig. 13) has three or four teeth in the outer cutting edge, but the inner is reduced, less chitinous, and consists of a number of small teeth. Below is the ciliated lappet as in the left mandible. Only two penicilla are present (1 + 1), and a similar long seta.

The *lower lip* is formed of two lobes, which have the apex and inner margin setose, and a central rounded, setose portion.

In the *first maxillae* (Pl. XX, fig. 12) the apex of the outer lobe is armed with a number of chitinous teeth, the inner group of which are bi-unguiculate, the inner lobe bearing apically two slender plumose setae, and its inner side produced into a small spine.

The *second maxillae* (Pl. XX, figs. 10, 11) are angularly produced near the base. The outer lobe is small and bears apically a few spines; the inner is rounded and has the inner margin and apex fringed with strong spinous setae.

The *maxillipeds* (Pl. XX, figs. 8, 9) are long and narrow. The epipodite is more than half the length of the basal joints. In the endopodite only the ischium is distinct, the other joints being indicated by lobes on the inner margin. The whole of the inner margin is fringed with stout setae but externally there are only two spines, the ischium, also, bears two spines. The endite is narrow and reaches more than half way up the endopodite, its inner margin is fringed with setae and apically it bears a long curved spine, in addition to a jointed setose lash.

The posterior margins of the first four segments of the *mesosome* are practically straight, those of the last three concave and produced backwards at the lateral angles.

The posterior corners of the first four segments are sub-quadrate, of the fifth rounded, and those of the sixth and seventh sub-acute. The epimera of all the segments are well developed. The first three bear on the under surface, definite coxopodites in the form of raised ridges.

All the walking legs are similar in structure and increase slightly in length posteriorly. The dactylar seta is distinctive in shape, setose, narrow proximally, expanded and thickened distally, and has a blunt apex. The first two segments of the *metasome* are without epimera and covered laterally by the last mesosomatic segment. The epimera of segments three to five are large, contiguous and slightly recurved, those of the fifth bordering the uropods laterally. The terminal segment is rounded posteriorly, very short, convex and much broader than long.

The *uropoda* project beyond the terminal segment occupying practically the whole of the space between the epimera of the fifth segment. The base is broad and rectangular, with the inner distal corner obliquely cut, the posterior margin crenate and bearing a number of stout short spines. The outer ramus is spatulate, inserted upon the upper surface near the mesial border, projecting posteriorly slightly beyond the base. The apex is armed with a number of long setae and a few smaller ones. The inner ramus rises from the under surface of the base far forward, is slender and scabrous, the apex bearing one long bristle and one or two smaller ones.

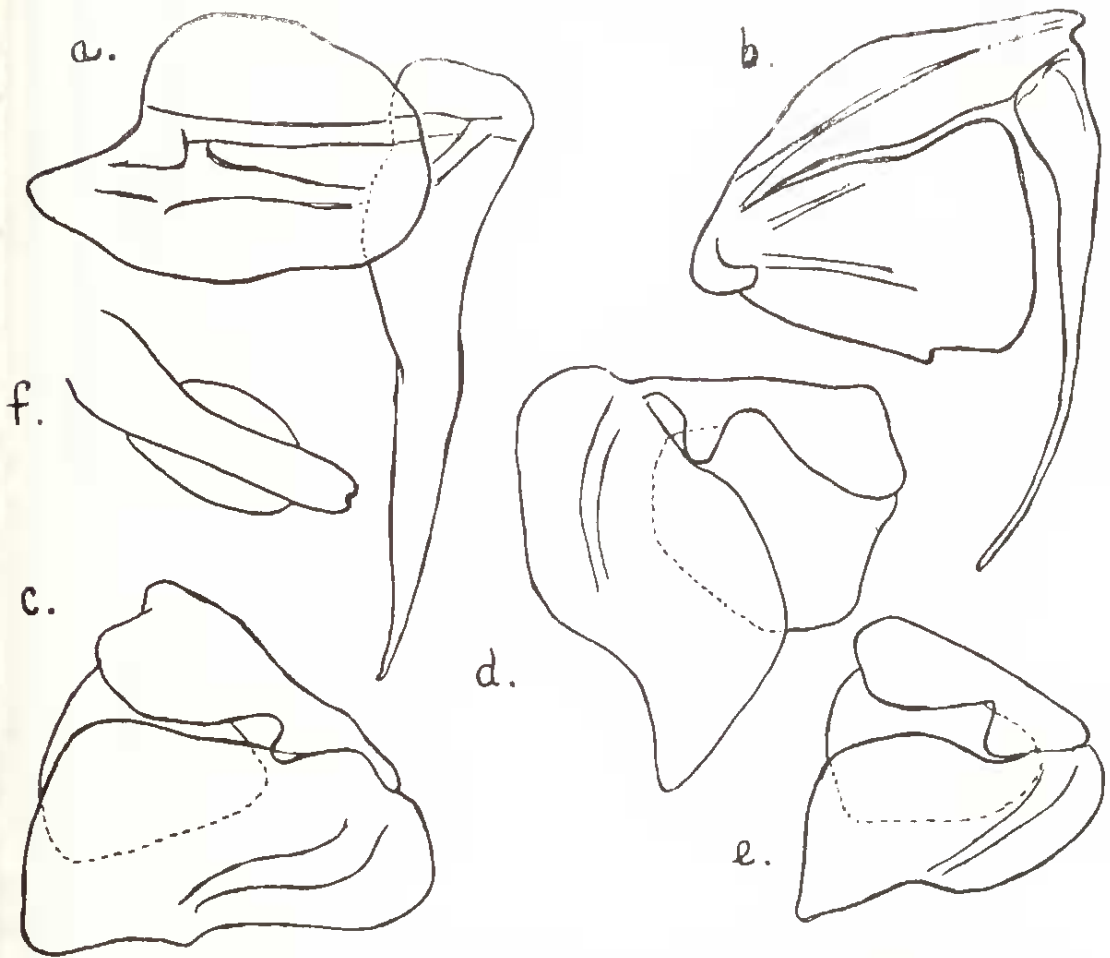


FIG. 2.—*Actaaccia pallida*, male: a, first pleopod; b, second pleopod; c, third pleopod; d, fourth pleopod; e, fifth pleopod; f, male organ.

In the male the exopodites of the *first pair of pleopods* (fig. 2a) are articulated along the middle line, the endopodites broad at the base and tapering to a point. The male organ (fig. 2f) is single, with a broad basal portion and notched at the end.

The *second pair of pleopods* (fig. 2b) has the exopodites roughly rectangular, the endopodites two-jointed, the first joint being long and at right angles to the second which is slightly more than twice the length of the exopodite and tapers gradually to a point.

The third (fig. 2c), fourth (fig. 2d) and fifth (fig. 2e) pairs of pleopods have the exopodites well developed, the endopodites branchial and roughly rectangular in shape. In all, the exopodites have thickened ridges and no setae are present on the margins.

Air cavities are absent.

None of the specimens can be definitely recognized as females.

Colour, dead white, with irregularly branched brown markings.

Length of largest specimen not exceeding 7 mm.

Habitat.—This species has been taken on the beach at Leighton and Cottlesloe from tightly rolled balls of *Cymodoce* stalks washed up on to the shore. Probably it enters these from the sand at or near tide mark. They may be submerged at times. Their colour harmonizes wonderfully with the white sand of the sea shore and this, with their power of curling into a ball, makes them difficult to distinguish.

Remarks: This species appears to be intermediate in structure between *A. euchroa* and *A. opihensis*. In the general form of the body *A. pallida* resembles *A. euchroa* and, as in that species, the uropods have the outer ramus spatulate. In the condition of the eyes however, it resembles *A. opihensis*. The degree of development of the eyes is probably correlated with the habits of the animal and not to be regarded as of generic value, as Chilton seems inclined to assume (1901, p. 132).

The antennules have the usual three joints, the articulation of the third joint being very indistinct. In the antennae the fourth joint of the flagellum is similar to that of *A. opihensis*, being longer and more slender than in *A. euchroa*.

The first and second maxillae as in the other two species of *Actaccia*, resembles in general structure those of *Scyphax* as figured by Chilton (1901, Pl. XIV, fig. 2). In the mandibles the lower tuft of setae representing the molar tubercle appears to be in the form of a single brush-like seta, while the masticatory lobe of the maxillipedes has, in addition to a stout curved spine, a jointed lash differing from that figured for *A. opihensis*.

The dactylar setae on the legs are distinctive in shape.

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EXPLANATION OF PLATES XIX AND XX.

PLATE XIX.

All the figures refer to *Cubaris wilsmorci* and are drawn from a male specimen.

- Fig. 1. Dorsal view of entire animal.
2. Anterior view of the cephalon.
3. Dorsal view of the telson, with uropods and the fifth metasomatic segment.
4. Underside of the lateral margin of the first and second mesosomatic segments.
5. Antenna.
6. Antennule.
7. Terminal portion of outer and inner lobes of first Maxilla.
8. Second maxilla, terminal portion.
9. Terminal portion of right maxillipede, ventral view.
10. Right uropod, ventral view.
11. Dorsal view of left uropod.
12. Spine from the mesosome showing the development of scales.
13. Terminal style of antenna.

PLATE XX.

All the figures refer to *Actaccia pallida* and are drawn from a male specimen.

- Fig. 1. Dorsal view of the whole animal.
2. Antenna.
3. Antennule.
4. Under surface of the first, second and third segments of the mesosome showing the coxopodites.
5. Ventral view of the terminal segment and uropods.
6. First mesosomatic appendage.
7. Dactyl with dactylar seta.
8. Under surface of right maxillipede.
9. Terminal portion of right maxillipede.
10. Second maxilla.
11. Terminal portion of second maxilla.
12. Terminal portion of first maxilla.
13. Terminal portion of right mandible.
14. Terminal portion of left mandible.

